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10/083,366	02/27/2002	Tsung-Hsiung Wang	WANG3118/EM	5874

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EXAMINER

PADGETT, MARIANNE L

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 09/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/083366

Applicant(s)

Wang et al

Examiner

M. L. Padgett

Group Art Unit

1762

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☐ Responsive to communication(s) filed on 7/11/03
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 11-24 is/are pending in the application.
- ☐ Of the above claim(s) is/are withdrawn from consideration.
- ☐ Claim(s) is/are allowed.
- ☒ Claim(s) 11-24 is/are rejected.
- ☐ Claim(s) is/are objected to.
- ☐ Claim(s) are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some* ☐ None of the:
 - ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

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1. Applicant's election with traverse of Group I, method claims (now 11-24) in Paper No. 5 is acknowledged. The traversal is on the ground(s) that all claims are now method claims (Group I). This is not found persuasive because the restriction is now mute; i.e. all product claims have been canceled, hence there is no longer any restriction to consider, nor to traverse.

2. Claim 19 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 19 is dependant from cancelled claim 2. While this is presumably a typographical error, and the examiner might guess that "12" was intended, this is only a guess and has no official standing.

3. Claims 11-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11, step (b) does not make sense as written; specifically it claims that the method, i.e. "a precise coating method", is on the treated substrate surface (but with no articles showing antecedence). Method is a noun for an action or actions, and while it can take place on the surface, it cannot physically be on the surface as claimed, as it is not a physical thing. Step (b) goes on to claim "was homogeneously coated..." but this part of the phrase has no clear noun to which it refers, probably due to a complete break down in any English grammar. Logic says that the coating should be on the substrate, but the claim language, such as it is, and does NOT necessitate this. Furthermore, as "was... coated..." is in the past tense, but listed after the subjecting step (a), it is not clear whether it was intended to be on the wherever (substrate?) before or after the "microwave... treatment".

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In step (c), “the coating process” lacks any antecedent basis, due to inconsistent claim language. While the examiner presumes that “process” is actually intended to refer to the coating method of step (b), the use of a different term makes it so there is no clear or necessary relationship between step (c) and the preceding or previously listed steps. Also, in step (c), line 2, to what does “it” refer? Neither control nor process are the types of nouns that can appropriately be said to be subjected to an electromagnetic field, but they are the only nouns in the appropriate part of the sentence to which “it” may properly be referring. Exactly what is being done, besides some how effecting the position/order/orientation/stacked molecular structure/conductivity of the polymer (film), is unclear.

Use of relative terms, that lack clear metes and bounds in the claims, or in clear definitions in the specification or in relevant cited prior art, are vague and indefinite. In claim 11, step (b), see “precise”. In what way, or how is the method precise? In step (c), “to strengthen” and “to increase” from what? If one does not know the state, or value, or position, or orientation (or degree thereof), etc., before one starts, strengthening or increasing the quantity has no clear meaning or scope, for the claims as written.

In claims 15 and 16, lines 2-3, “the precise coating engineering” (emphasis added) has no antecedent basis, i.e. was not introduced anywhere in claim 11, let alone in step (b), hence these claim limitations have no clear relationship thereto.

In claim 17, lines 2-3 “said the molecular structure sequential ordered and a self-stacking field control of (c)” (emphasis added) lacks antecedent basis due to inconsistent terms in the limitation. [Note, examiners in 1700, by order of 1700 management, no longer reject minor antecedence or grammar errors, such as the above “said the” (also see claim 14), or incorrect article (or lack thereof) usage for antecedence that does not cause confusion, so applicant might wish to proofread for such and correct them, in order to improve claim clarity].

In claim 18, “the aniline compound” lacks any antecedent basis, as no such term was introduced in claim 11 or 12. Assuming applicants were intending to refer to the “polyaniline” in claim 12, then

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they should further note that in order to further limit that alternative choice, that they should positively claim use of that choice, as well as using consistent terminology.

With respect to claim 19, whatever the dependence was suppose to be instead of cancelled claim 2, there is no "oxidant" in any of the physically preceding claims, for this claim to be referring to, so no guess can reasonably be made, as to how this limitation should fit into the overall process, i.e. the claim is unexaminable.

In claim 20, "the blending agent" lacks any antecedent bases, and it is unclear where in the process it is intended to be used, as no limitations connecting it to any other limitation of either claim 11 or 12 is claimed.

With the above problems in mind, serious proofreading of the claim language is recommended.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of

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each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 11-12, 14-17 and 19 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Burroughes et al.

In the claims, it is uncertain whether the microwave plasma is used before application of the conductive polymer solution, just during or after, or at some combination of all these time periods, as discussed above in section 3, hence this rejection is applied as a 102/103 due to this uncertainty in claimed temporal usage of the microwave plasma.

In Burroughes et al, see the abstract; Figures 5-6, 9-10 and 12; col. 3, line 21- col. 4, line 31 and col. 5, lines 22-45 formation of transport and/or emissive layers via self-assembly, i.e., layer-by-layer polymer deposition techniques, where deposited layers or sub-layers are treated to vary or modify their electronic characteristics. The reactive agent for this modification may suitably be an oxidative reaction, such as use of oxygen plasma. Suggested polymeric material for the transport layer include polythiophene compound, doped with a sulphonic acid (PEDOT: PSS) and polyaniline compositions doped, undoped or partially doped, while emissive layer includes a list of conjugated or partially conjugated polymers (col. 5, line 61- col. 6, line 37).

While the transport layer is deposited on an ITO anode, col. 7, lines 28-44 teaches alternative conductive materials such as PEDOT: PSS or doped polyaniline may be used therefore, while col. 7, lines 49-col. 9, line 14, discusses deposition of the PEDOT: PSS and emissive layers, where the former is noted to be around 50 nm, and a specific example of reactive treatment of the polymer layer using PEDOT: PSS is given, which employs oxygen plasma with Ar added to its gas composition. Note col. 9, line 58+ teach that the plasma makes it easier to "select the shape and extent of the transition region from the normal doped PEDOT work function (W_f) to the ...", thus providing teachings to control of position of deposits

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and of electrical properties, via use of the microwave plasma, whose gas (i.e. fluid) flows and electromagnetic field parameters are controlled. Further teachings on O-plasma treatment are found on col. 9, lines 38- col. 10, line 21, with col. 10, lines 22-43 discussing alternate materials; line 44-50 discussing use of other oxidants and gases including O_3 , H_2O_2 , H_2 , CF_4 , etc.

Column 10, lines 51- col. 13, line 20 discuss subsequent layer deposition, sub-layers examples, with implications that the treatment of the polymer, as by the exemplified microwave O-plasma, may be to each layer or to surface layers. It is noted that such can be considered to cover the possible meaning of pretreatment before deposition of the conductive polymer solution, as treatment with O-plasma of one polymer layer, followed by deposition of a subsequent laser or sub-layer (also may be plasma treated) is pretreatment of the subsequent layers' substrate. Alternately, as the anode ITO layer may be substituted for by a claimed conductive polymer as taught on col. 7, lines 35-40, it would have been obvious to adjust the surface electrical characteristics, thereof as taught for these polymers with microwave O-plasma, in order to provide the controlled and continuously varying electrical characteristics of Burroughes et al's teachings.

6. Claims 13, 18 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burroughes et al.

While Burroughes et al do not teach the specific substitutional ligands for aniline of applicants' claims 18 and 20-24, they teach polyaniline generally, and include doped, partially doped and undoped species, hence it would have been obvious to one of ordinary skill in the art to employ any known conductive polymer derivative of the basic polyaniline compound, especially as these claimed substitution can be considered to provide a form of doping, which is taught. Note with respect to the blending agents (claims 20 & 24), that it appears to be related to the aromatic sulfuric acid compounds taught by Burroughes et al as dopants to the polythiophene compound, hence use of such compounds when forming doped polyaniline would have been suggested, thus obvious.

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In col. 8, Burroughes et al provides a specific example of microwave O-plasma parameters, but does not state therein the same quantities or units as applicants' claim 13, and the examiner has no way to deduce values for the claimed quantities therefrom, however as like materials, and like effects are being employed and produced, parameter values as claimed would have been expected. Also, while the col. 8 example is for a specific deposit of specific material, one of ordinary skill in the art would have been expected to optimize treatment for different deposition materials, and the dimensions and construction of the specific plasma apparatus used would have effect optimization of parameter, such the power employed, especially since power density (watts/volume or area) has more significance than total power which will vary according to the volume over which the plasma is applied.

7. Other art of interest includes: Baalmann et al, Imada et al; Hennecke et al (German patent with English abstract); and Matsumoto et al (Japanese), teach various conductive polymer deposition process that may employ microwave plasmas, but use gaseous reagent sources, not deposition of solutions that are treated (pre or post, etc.) Lelental et al teach a plasma process, which may use microwaves, to treat a solution containing polymeric material, to form a conductive layer, but this results is from decomposition of an organometallic in the composition, which is not a conductive polymer, *per se*.

Asakura et al is relevant for its prior art teachings (col. 43, line 26- col. 44, line 20) that conjugated polymers, such as polyaniline are known to be converted from semi-conductive to conductive by "photon doping", via use of radiation from sources including electron beams, x-rays, various lamps and lasers, and "lasers plasmas", etc.

Yunogami et al is of interest for microwave plasma treating the substrate before coating a solution of conductive polymer thereon (abstract; Figures 1, 3-5; col. 5, line 61-col. 7, line 34).

8. Any inquiry concerning this communication from the examiner should be directed to M. L. Padgett whose telephone number is (703) 308-2336. The examiner can generally be reached on Monday-

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Friday from about 8:30 a.m. to 4:30 p.m.; and fax phone numbers are (703) 872-9310 (regular); (703) 872-9311 (after final); and (703) 305-6078 (unofficial).

M.L. Padgett/dh 8/20/03
August 25, 2003

**MARIANNE PADGETT
PRIMARY EXAMINER**